METHOD OF USING A LUBRICATING MEMBER FOR FOOD-PROCESSING EQUIPMENT

BACKGROUND OF THE INVENITON

The present invention relates to a lubricating member for use in the lubrication of rolling bearing, linear motion device (ball screw, linear guide, etc.) or the like for food-processing equipment.

JP-A-10-19047 (The term "JP-A" as used herein means an "unexamined published Japanese patent application") and JP-A-10-36875 disclose a lubricating member for food-processing equipment and a rolling bearing comprising the lubricating member. JP-A-10-19047 proposes that as a lubricating member for food-processing equipment there be prepared a mixture of a thermoplastic resin and a food oil, a liquid paraffin for food additives or a lubricant component made of a mixture thereof which is then heated and solidified in the interior of bearings.

JP-A-10-36875 proposes as a lubricating member for food-processing equipment one comprising a ultrahigh molecular polyolefin and one or more oils selected from the group consisting of liquid paraffin, poly-α-olefin oil, vegetable oil and animal oil.

The lubricating members for food-processing equipment disclosed in the above-mentioned patents comprise as a base

a resin which is said to be harmless to human beings and as a lubricant component a material which is harmless or less harmful to human beings. However, even such a lubricating member for food-processing equipment can have its base resin component eluted at raised operating temperatures. The resin component thus eluted can harm human beings.

One of the standards of safety of lubricants for food-processing equipment is FDA (U. S. Food and Drug Administration) regulation. The lubricating member for food-processing equipment which can have its base resin component eluted doesn't conform to this regulation.

SUMMARY OF THE INVENTION

The present invention has been worked out in the light of the foregoing problems with the prior art. An object of the invention is to secure a lubricating member for food-processing equipment with safety.

In order to solve the foregoing problems, the present invention provides a method of using a lubricating member for food-processing equipment which comprises using a lubricating member for food-processing equipment made of a polyolefin resin and a lubricant usable for food at a temperature of from the pour point of said lubricant to not higher than 70°C.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a graph illustrating the relationship between the ultraviolet absorbance of a lubricating member for food-processing equipment at 20°C, 50°C and 80°C and wavelength; and

Fig. 2 is a graph illustrating the relationship between absorbance at a wavelength of 330 nm and temperature.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Embodiments of implication of the present invention will be described hereinafter.

FDA regulations contain one concerning lubricants with incidental food contact. This regulation covers color and ultraviolet absorbance. It is stipulated that color be 20 or more as calculated in terms of Saybolt color determined according to the method defined in ASTM D156 (corresponding to JIS K2580).

It is also stipulated that ultraviolet absorbance be not greater than the following various predetermined values as calculated in terms of absorbance per cm of light patch within various wavelength ranges. In other words, it is stipulated that absorbance be 4.0 or less within the wavelength range of from 280 to 289 nm, 3.3 or less within the wavelength range of from 290 to 299 nm, 2.3 or less within the wavelength range of from 300 to 329 nm, or 0.8 or less within the wavelength range of from 330 to 350 nm.

In this respect, as a lubricating member for

food-processing equipment there was used one comprising 30% by weight of a polyolefin resin and 70% by weight of a liquid paraffin which was then measured for ultraviolet absorbance at 20°C, 50°C and 80°C. The results are graphically shown in Fig. 1. The measuring instrument used covers absorbance of 5.0 or less.

As can be seen in the graph of Fig. 1, when the temperatures are 20°C and 50°C, the lubricating member shows an absorbance conforming to FDA regulation within all the wavelength ranges. On the contrary, when the temperature is 80°C, the lubricant shows an absorbance departing from FDA regulation within the most wavelength ranges. The relationship between absorbance at a wavelength of 330 nm and temperature determined by these measurements is graphically shown in Fig. 2. As can be seen in the graph of Fig. 2, when the temperature is 70°C or lower, the lubricating member shows an absorbance of 0.8 or less, which conforms to FDA regulation.

As can be seen in the foregoing description, a lubricating member for food-processing equipment comprising a polyolefin resin as a base may be used for food-processing equipment more safely at an operating temperature of 70°C or lower than at an operating temperature of higher than 70°C.

The lower the operating temperature of lubricating member for food-processing equipment is, the more difficultly can occur the elution of the base resin component. However, when the

operating temperature of the lubricant falls below the pour point of the lubricant, the lubricant cannot run out of the lubricating member, making it impossible for the lubricant to work. Accordingly, the lower limit of the operating temperature is defined to be the pour point of the lubricant.

While the present embodiment has been described with reference to a lubricating member for food-processing equipment comprising 30% by weight of a polyolefin resin and 70% by weight of a liquid paraffin by way of example, the method according to the invention can be applied to any lubricating members for food-processing equipment comprising a polyolefin resin and a lubricant usable for food.

Examples of the lubricant for food constituting the lubricating member for food-processing equipment employable herein include liquid paraffin, poly-α-olefin oil, vegetable oil, animal oil, grease for food-processing equipment, and lubricant for food-processing equipment. These lubricants may be used singly or in combination of two or more thereof. The ratio of lubricant for food to polyolefin resin is 10 : 90 to 90 : 10 by weight, for example.

As the polyolefin resin constituting the lubricating member for food-processing equipment there may be used polyethylene, polypropylene or polymethylpentene.

As mentioned above, the method according to the invention makes it possible to secure a lubricating member for

food-processing equipment with safety.

While there has been described in connection with the preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is aimed, therefore, to cover in the appended claim all such changes and modifications as fall within the true spirit and scope of the invention.